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# Air Travel and Airline Operations in Nigeria: Market Potentials and Challenges

*Adebukola Daramola and Tunde Fagbemi*

## Abstract

In this chapter, we analyse air traffic in Nigeria's domestic network and show the pattern of distribution in the last decade (2008–2017). We attempt to analyse factors responsible for observed patterns, thus explaining contributory factors driving the demand for air travel. Air fares are a major factor in demand, as there are alternative modes by which journeys can be completed. High costs related to provision of airline services appear to be a major factor driving prohibitive air fares. Much of the potential market for air travel is thus excluded to other modes, while traffic patterns show few commercially viable nodes—Lagos, Abuja and Port-Harcourt in a network of 20 cities. The paper proposed strategies to achieve reduced cost of operations for airlines, which hopefully will inform reduced fares and positively affect propensity to fly in Nigeria.

**Keywords:** network, air traffic, Nigeria, passenger, propensity

## 1. Introduction

The air transport industry in Nigeria experienced a landmark event in 1985 when entry into the domestic airline sector and air fares were formally deregulated. The narratives around the industry gradually changed from a national carrier focus to one focused on private carriers. By 2003, the industry was composed entirely of private carriers. Apart from deregulation of airline services, government, in recent years is gradually divesting from air transport infrastructure and encouraging provision of these by the private sector as well. Some gains of private participation are readily observable in the airline sector, namely increased competition, more efficient electronic based booking systems, and discount fares in some cases. Analysis of air transport in Nigeria easily bifurcates into pre-deregulation and post-deregulation periods; however, after more than three decades of deregulation, patterns of air traffic in the post-deregulation period can be interrogated for meaningful explanations without much recourse to the pre-deregulation years.

The air transport subsector in Nigeria accounts for the second highest share of modal contribution to transport output. The road sub-sector accounts for as much as 84% of transport GDP while air transport share in the last couple of years has averaged about 6–7%. With respect to contribution to the local economy, Phillips Consulting [1] notes that the aviation industry supports 254,500 jobs in Nigeria and contributes US\$940 million (N184.7 billion) to national GDP<sup>13</sup>. Of this sum,

49% (i.e. US\$462 million or N90.8 billion) is a direct output of the aviation sector (via airports, airlines and ground services), while the remainder is acquired indirectly (via the supply chain). An additional US\$464 million (N91.2 billion) is derived from tourism, which raises the overall contribution to US\$1.4 billion (N275.9 billion). Nevertheless, the air transport sub sector has much more potential for contributing to the local economy particularly through increased capacity for earning and conservation of foreign exchange.

The industry has witnessed a high turnover of domestic carriers since deregulation; generally, many of the local airlines experiences in the industry have been short lived, with many often operating a few years and then folding up. Currently there are only about eight active scheduled domestic passenger carriers in the Nigerian airline industry, although total number of active Nigeria registered carriers is put at 23 [2]. In the next section we discuss air travel demand elasticities as a guiding concept for the discourse.

## **2. Air travel demand elasticities**

The demand for a particular good or service depends on a variety of factors, among them consumers' taste, income level, price and quality of the product in question and the prices of other goods, especially goods that are close substitutes. As a general rule, when other influences on demand remain unchanged, a higher price for a product results in a lower quantity demanded. However, the price responsiveness of demand varies from one good to another and from one market to another. The own-price elasticity of demand measures the responsiveness, or sensitivity, of the demand for a good to changes in its price when other influences on demand are held constant. It is defined as the percentage change in quantity demanded resulting from a given percentage change in price.

In the case of air travel, studies distinguish among markets for business and leisure travel; as well as for long-haul and short-haul travel. Accordingly, to examine the sensitivity of the demand for air travel to its price, separate estimates of the own-price elasticity of demand are gathered for each of these distinct markets [3].

Since the availability of alternative modes of transportation that are reasonably close substitutes for air transport diminishes with distance travelled, it is expected that the demand for air transport will be less elastic for longer flights than for shorter flights. Furthermore, international travel tends to be spread over more time than domestic travel, so that the airfare is a smaller proportion of overall trip costs, which makes international travel less sensitive to changes in ticket prices. In addition, leisure travellers are more likely to postpone trips to specific locations in response to higher fares, or to shop around for those locations offering more affordable fares. Consequently, it is expected that the demand for air transport for leisure reasons will be more elastic than business travel.

This basic concept of own-price elasticity of air travel in different market segments suggests that if air fares are reduced on Nigeria's domestic routes, demand for air travel is likely to increase, since these routes are short-haul.

The next section examines revenue passenger kilometres achieved vis-a-vis economic and demographic profiles for Nigeria and selected comparator countries.

## **3. Cross-country profiles**

Comparator countries are chosen based on similar geographical size range (Venezuela and Egypt), similar demography, specifically population size

range (Brazil and Pakistan) and similar economic profiles specifically size of GDP (Venezuela and Egypt).

Nigeria achieved the lowest revenue passenger km (1894 km) in the 2015/2016 period among the five countries. Venezuela’s population is only about 17% of Nigeria’s but, it achieved higher revenue passenger km (5142 km) in 2015/2016 period. Similarly, Egypt, which is only about half the Nigerian population, achieved revenue passenger km eight times higher than that of Nigeria during the period. Pakistan, whose population is closely similar to Nigeria’s recorded revenue passenger km seven times higher than Nigeria’s. Although real GDP growth rate for Nigeria is highest among the five countries, its GDP per capita is lower than what obtains in other countries, except Pakistan. Aside from Brazil which is much larger, other comparator countries are within similar territorial size range as Nigeria.

As seen in **Table 1**, Nigeria has the lowest propensity to fly among all countries for which data was available. This story is a paradox of sorts, given that the geography as well as the demographic profile in Nigeria favours air travel. The country has a working population of over 73 million, which, in addition to the fact there are substantial inter-city distances, should favour propensity to travel by air. The low GDP per capita probably provides some explanation for low PTF, but again, Pakistan has a lower GDP per capita and still manages to record a higher PTF than Nigeria. The number of active domestic airlines is also lower in Nigeria than in other countries, again indicating the low level of demand for air travel.

Air fares are observed to be on the high side. The most trafficked route in the network, Lagos-Abuja has an average fare of N30,000 per passenger flight hour. This translates to about \$83.3 at the current rate; meanwhile, flights on Boeing 737–700 series in western countries offer \$33.33 per passenger flight hour [8]. In Africa generally, infrastructure services are observed to be twice as expensive as elsewhere. This is not peculiar to air transport; power, water, road freight, mobile telephones and internet services also mirror the same trend.

Customer confidence in Nigerian airlines is another reason air travel demand is deemed low. The aircraft stock shows that the average fleet age is about 20 years. This contrasts sharply with fleet age for Africa’s best airlines—Ethiopia airlines for example is said to have an average fleet age of 5 years.

The government of Pakistan in 2015 launched a ‘liberal bilateral open skies ational aviation policy’. This policy included incentives to investors, among them

Country	Air traffic indicators (2015/2016)			Geography/demography (2016)		Economic Indicators (2008–2016 average)		
	Rev pax (million)	PTF <sup>1</sup>	Number of active domestic airlines	Territory (‘000 km <sup>2</sup> )	Population (million)	GDP (USD billion)	GDP per capita	Real GDP growth (%)
Nigeria	3373	0.018	8	923	183.6	318.7	1894	4.7
Venezuela	5142	Na	21	916	31	305.8	10,326	1.1
Brazil	120,001	0.5	16	8514	206	2032.5	10,268	1.6
Egypt	23,180	0.114	16	1001	90.2	253.5	3684	4.3
Pakistan	21,311	0.043	Na	881	181.7	221.5	1241	3.5

Sources: [4–7].

<sup>1</sup>PTF refers to propensity to fly. It is calculated as volume of passengers divided by country population in the year.

**Table 1.**  
Country profiles.

a zero taxation on investments in the sector. A minimum of eight aircraft was set as threshold for any airline company willing to operate in the country- three for domestic and five for international operations. Service provider functions were also separated from regulatory functions [8].

Venezuela runs a socialist economy, hence the aviation industry is mostly government controlled. Hyper inflation, macroeconomic distortions coupled with state intervention have contributed to volatile regulatory framework in the country. Nevertheless, Venezuelan domestic carriers have struggled to keep afloat, swapping domestic flights for international services [9]. Despite these fundamental challenges, Venezuela achieved higher revenue passenger km than Nigeria in 2015/2016 period.

In the following section, we examine spatial patterns and nodal traffic densities in Nigeria's air transport network.

#### **4. Airline network patterns**

According to the NCAA, Nigeria has 20 airports, over 18 aerodromes and over 30 regulated airstrips and heliports; 23<sup>1</sup> domestic airlines; 554 licenced pilots; 913 licenced engineers and 1700 cabin personnel. Nigeria is an important destination for over 22 foreign carriers, it currently has Bilateral Air Services Agreements with over 78 countries. There are direct connections from Nigeria to many of the world's business centres such as London, Paris, Frankfurt, New York, Johannesburg, Atlanta, Amsterdam, Dubai and Jeddah to mention a few. With the attainment of America's Federal Aviation Administration (FAA) International Aviation Safety Assessment (IASA) Category One Certification in August 2010, Nigerian registered carriers can now fly directly into the United States of America (USA) [2]. Above provides a background for observed network patterns. Our emphasis in this chapter is on the domestic network.

The domestic network, which is naturally built around the airports has changed configuration over the years. In 2008 there were fewer air corridors for traffic as seen in **Figure 1**.

By 2017, the network had a higher route density, showing that new air corridors were cultivated over the period (**Figure 2**).

During the 2008–2017 period, 139 million passengers flew through Nigeria's airports, 100 million of these were domestic passengers, while the rest were International passengers. Domestic passengers formed over 70% of passenger traffic during the period. Growth in domestic passenger traffic ranged from –14% in 2017, to as high as 39% in 2008. Growth trend was mixed during the decade, recording negatives in 2012, 2013, 2015 and 2017. There was a major crash in the domestic sector in 2012 which dampened demand in the ensuing months. 2015–2017 were years of economic slow down. The first signs of recovery occurred in late 2017 from an economic recession, which reached a bottom out point in 2016. These among other factors were responsible for declines in passenger traffic in various years.

During the entire decade, Lagos, Abuja and Port-Harcourt were the nodes with the greatest shares of traffic. Kano, Kaduna, Enugu and Osubi had medium volumes of passenger traffic, similar to Benin and Owerri in 2008/2017. Other nodes in the air network were small volume nodes. This leads us to discussions on nodal densities in the network.

<sup>1</sup> Not all of these are active, some do not offer scheduled passenger services.



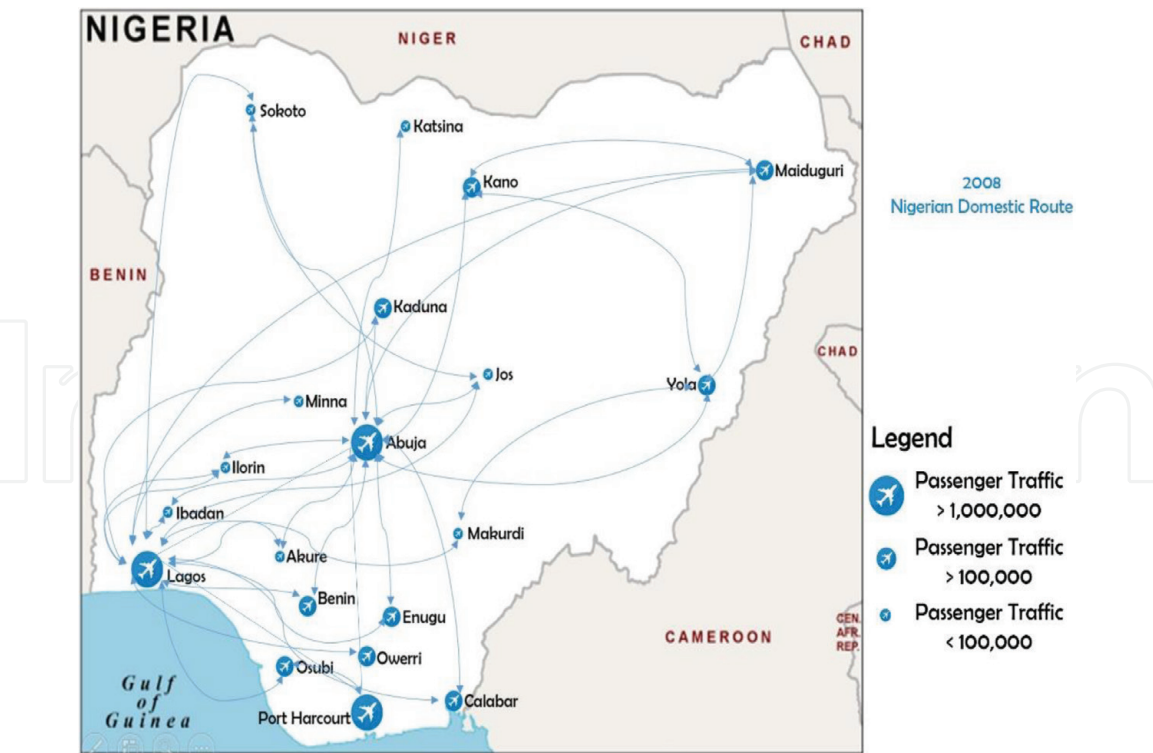


Figure 1.  
Air traffic network, 2008. Source: Authors' survey.

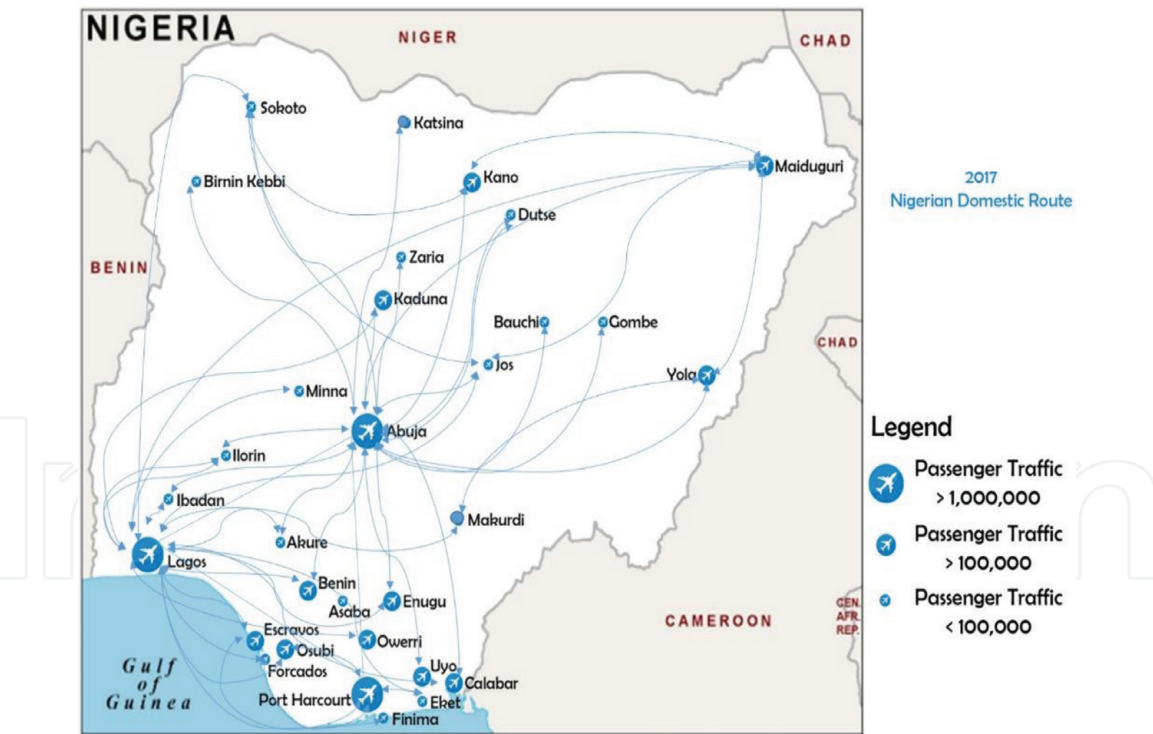


Figure 2.  
Air traffic network, 2017. Source: Authors' survey.

#### 4.1 Nodal traffic densities

Airlines in Nigeria, as in several places, are mostly passenger movers, hence, our focus is on passenger traffic. Traffic at the 20 nodes shows that over the period 2007–2016<sup>2</sup> Lagos, Abuja and Port-Harcourt airports accounted for 76% of domestic

<sup>2</sup> Traffic was disaggregated by nodes for this period.

passenger traffic at the 20 domestic airports. Shares of passenger traffic in the three cities were 36, 30 and 10% respectively. This pattern shows there is strong dominance reflected in a sharp core-periphery structure of air passenger movements. Abuja and Lagos are Nigeria's political and commercial capitals respectively, while Port-Harcourt is a major oil producing city. Clearly, the cost of air fares naturally excludes a large share of Nigeria's travelling public.

Much of the movements recorded in Lagos pertain to corporate travellers in the middle and high income categories, Lagos houses much of this group in Nigeria given its status as a megacity. In Abuja, passengers are mostly top government and private sector workers, while Port-Harcourt travellers thrive on the oil economy. The lower middle class where a great potential for market exists generally do not find air fares affordable. They therefore resort to corporate road transport services.

The implication of low traffic densities in several nodes is that many city-pair routes are not commercially viable to the degree that active airlines will increase their service frequencies on these sectors. Consequently, many nodes in the network do not record sufficiently large passenger movements. Nevertheless, city pairs in Nigeria's network have great potential for air travel as road distances on these corridors range from 200 km to over 1400 km. Air transport offers the fastest means of covering these distances as long as airlines keep to scheduled departure time.

## **5. Factors constraining airline operations and viability**

### **5.1 Operational/maintenance costs**

Airlines maintenance costs are mostly borne in foreign currency. Scarcity of forex for airlines operating in the country was even more pronounced in the wake of the recession in the 2016/2017 period. The exchange rate of the Naira to the dollar increased by over 200% at a point and this increased airlines' operational costs significantly. Taxes are equally high, so is fuel cost.

### **5.2 Small size of carriers**

Nigerian airlines are small, with fleet sizes as low as three for some airlines, the actual market is equally small. Although market potentials exist along several under-utilised air corridors, the smallness of airlines does not permit them to explore these potential routes. Airlines may not be able to break even given the low load factors that are likely to exist on such routes. Small size of carriers also constrains capacity to offer frequencies and compete on regional and international routes. Nigeria's domestic airlines are therefore not strong players in the international and regional markets.

### **5.3 Lack of airline competition**

Competition is a natural result of many players in an industry. Economies of large scale production naturally drives down costs. However, as profit oriented actors, airlines will not venture into an industry where there is low propensity to fly. The lack of airline competition and the absence of regional airport hubs are some of the constraints identified in Africa's aviation [10].

## **5.4 Infrastructure challenges**

Power is one of Nigeria's biggest infrastructure challenges. The cost of providing alternative sources (usually using diesel powered generators) in the face of public power shortages is prohibitive. The airport operators naturally pass these costs on as part of airport charges. Airlines will then pass these on to the final consumers. These all add up to airfares.

## **6. Recommended strategies for improved airlines' operations**

### **6.1 Reduce airlines' maintenance costs**

A worthwhile strategy would be to put policies in place which will enable airlines reduce cost of operations. Thereby, lower fares can be offered to attract more patrons into air travel. Establishing an aircraft leasing hub and aircraft maintenance, repair and overhaul facility in Nigeria will be a step in the right direction. If domestic airlines can access aircraft and maintenance services locally, then scarce foreign exchange can be conserved. New airlines venturing into the industry may also be given incentives in the form of some tax holiday for specified period. The responsibility here lies with the regulatory agencies—Nigerian Civil Aviation Authority (NCAA) and Federal Ministry of Aviation (FMA).

### **6.2 Explore airline co-operation**

There may be economic sense in exploring co-operations at the national as well at the regional level. Such arrangements enable players to create and take advantage of scale economies. Hopefully, competitive prices and better quality will result and will trigger increased demand for air travel. Amalgamations will also enable domestic carriers compete better in the regional and international markets. Co-operations and alliances have proved useful among air carriers in developed climes. Incidentally, carriers in developed countries are several times bigger than African carriers. The responsibility here lies with airline operators and management.

### **6.3 Provide alternative power infrastructure**

It may be worthwhile to consider renewable energy options, such as solar power to complement power needs at the country's airports. Nigeria falls within the tropics and has average daily sunshine time up to 8 h in dry season months. Although the capex for solar power facility may be high, subsequent recurrent costs are likely to be far below costs incurred from current power provision options being explored. This could be another way of achieving reduced costs of airport operations and of airport charges passed on to airlines, which eventually gets passed to consumers. FMA and Federal Airports Authority of Nigeria (FAAN) will bear responsibility for this action.

## **7. Conclusions**

Clearly, increased demand for air travel and improved air transport operations need to be engineered in Nigeria. While the demographics and geography are highly



favourable for air travel, the prohibitive costs of air travel exclude several potential consumers of the service. The high cost of air travel is traced to supply side costs of operations, maintenance, taxes and other regulatory charges. These supply side costs can be reduced if the strategies proffered are explored. Recommendations include tax holidays to incentivize new entrants, co-operations among airlines, establishment of a local AMRO to conserve foreign exchange spending by airlines and provision of alternative renewable power to cut down cost of airport operations. Hopefully, these supply cost reduction measures will result in reduced/more competitive fares and incentivize potential consumers to patronise air travel. We hope by this, Nigeria's propensity to fly will increase, higher revenue passenger kilometres will be achieved and air transport can contribute more significantly to transport output in the nation's economy.

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## **Conflict of interest**

The authors affirm that this research paper has not been previously published in other outlets.

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## References

- [1] Phillips Consulting: The 2015 Domestic Aviation Industry. Customer satisfaction survey report. 2015. [www.phillipsconsulting.net](http://www.phillipsconsulting.net)
- [2] Nigerian Civil Aviation Authority (NCAA). NCAA and ICAO sub-section on NCAA website (homepage). 2018. [www.ncaa.gov.ng](http://www.ncaa.gov.ng)
- [3] Department of Finance, Canada. Air travel demand elasticities: Concepts, issues and measurements 1. 2008. [www.fin.gc.ca](http://www.fin.gc.ca)
- [4] Klaus Schwab. The Global Competitiveness Report, 2009-2017. World Economic Forum. Geneva
- [5] Central Intelligence Agency. The World Factbook. 2016. Central Intelligence Agency. [www.cia.gov](http://www.cia.gov)
- [6] The World Bank. World Development Indicators. World Bank, Washington DC; 2016
- [7] International Civil Aviation Organization. Presentation of 2016 Air Transport Statistical Results by ICAO, 2016
- [8] Roberto Leiro. Best of Airways-Venezuela's Turbulent Skies. 2017. <https://www.google.com/amp/s/tribune.com.pk/story/856566/forward-looking-policy-skies-make-way-for-new-aviation-policy/%3famp=1>
- [9] Available from: <https://airwaysmag.com/industry/whats-next-aviation-venezuela/>
- [10] Foster V, Briceno-Garmendia C. editors. Africa's Infrastructure: A time for transformation. Agence Francaise de Developpement and The International Bank for Reconstruction and Development/The World Bank. Washington, DC, USA; 2010